

REMARKS

The office action of April 6, 2005 has been carefully considered, together with the application including the pending claims, some of which have been previously amended in response to the previous office action. Since the mailing of this office action, applicant has executed and the undersigned has filed a Revocation of the Power of Attorney of the prior counsel representing applicant in this application and the appointment of the undersigned in the Patent and Trademark Office. In the event the Revocation and Appointment document has not reached the examiner, a duplicate copy is enclosed herewith for the examiner's possible consideration. Since the original claims were drafted and the amendments have been made by prior counsel, the undersigned has a more objective perspective of the condition of the claims and the status of the application.

It is strongly believed that the application is in condition for immediate allowance because the prior art cited and relied upon by the examiner simply does not teach or suggest the claims for many important reasons which previously existed but which were not set forth. For those reasons, which will be clearly described, reconsideration and allowance of all pending claims is respectfully requested.

More particularly, the examiner has maintained the rejection of claims 1-21, 25, 26, 28-34 and 38-50 under 35 U.S.C. 103 as being unpatentable over Reiffin in view of Jagannathan et al. (hereinafter "Jagannathan"). The identified claims include all independent claims 1, 11, 14, 26, 34, 40 and 42. The examiner states that the substitution of Jagannathan for Putzolu rendered applicant's arguments as moot via the new grounds of rejection. Applicant respectfully submits that Jagannathan, applied singularly or in combination with Reiffin or any of the prior art of record does not teach or suggest applicant's invention as claimed in independent claims 1, 11, 14, 26, 34, 40 and 42.

Turning to amended claim 1, the examiner states that Reiffin teaches a method for providing parallel execution of computing tasks in a heterogeneous computing environment comprising the partition step as claimed, but states that it does not specifically teach the use of mobile agents. The examiner then states that Jagannathan teaches the remaining steps including the final step of *maintaining, at a second computing host at which none of the mobile agents are executing, stack trace and state information about each of the mobile agents to allow one or more of the mobile agents to be reconstructed at an alternate computing host using the stack trace and state information*. The examiner cites to column 1, lines 9-15, column 6, lines 33-45, column 9, lines 1-11, column 17, lines 1-14 and column 24, lines 22-64 as meeting this element of the claim, but a careful review of the identified text leads applicant to the conclusion that it fails to teach or even remotely suggest this claimed step of the method.

More particularly, neither Jagannathan nor any other reference of record teaches or remotely suggests maintaining stack trace and state information about each of the mobile agents at a second computing host *at which none of the mobile agents are executing*. Jagannathan is not concerned with, i.e., it is silent about such a consideration as claimed. In fact, Jagannathan operates in a manner that is opposite from what is claimed. This is confirmed by Fig. 10 which clearly shows that the subagents have a task stack and task memory located adjacent one another within in the subagent.

This is not, as is sometimes dismissively stated, a distinction without a difference. There are significant if not substantial benefits that result from maintaining stack trace and state information at a second computing host at which none of the mobile agents are executing. With the present invention, there is a physical decoupling of the execution stack from the subagent itself which is clearly expressed in the language of claim 1. That decoupling enables a system to be created in which strong thread migration can still take place even if the agent itself or the machine upon which it is executing is destroyed or rendered inoperable or the network connection to the machine is lost.

Since the execution trace and stack information is maintained at another location than the location in which mobile agent is executing, it is possible to migrate the stack trace and state information to another agent and continue normal operation. Such operation contributes to reliability and relative immunity from such environmental conditions that include network latency, lack of available host CPU cycles, or even a hostile attack.

It should be apparent that unlike the method as claimed by applicant, if the stack trace is maintained on a local machine that is also running the agent as is specifically taught by Jagannathan, the destruction or inoperability of that machine or agent prior to contemplated migration to another machine, will prevent such migration from happening. With the present invention, the second computing host maintains the stack trace and state information and can therefore migrate the operation of a mobile agent that is destroyed to another mobile agent without encumbrance. For these reasons, it is strongly believed that claim 1 as amended is not taught or suggested by the references of record, applied singularly or in combination with one another.

Claim 11 is also directed to a method for providing parallel computing using mobile agents and comprises, *inter alia*, the step of storing stack trace and real-time state information about the one or more mobile agents at a first alternate computing host on which none of the one or more mobile agents are executing to allow one or more mobile agents to be reconstructed at a second alternate computing host. Neither Reiffin, Jagannathan nor any of the other references of record, applied singularly or in combination with one another teach or suggest this method for the reasons previously advanced with regard to claim 1.

Similarly, claim 14 is directed to a method for migrating a software application running in a virtual machine from a primary host to a secondary host comprising, *inter alia*, maintaining stack trace and state information about each of the plurality of mobile agents at a second computing host on which none of the plurality of mobile agents are executing. This claim is also not taught or suggested by the prior art of

record, applied singularly or in combination with one another for the reasons previously described with regard to claim 1.

With regard to claim 26, it is directed to a computer system that comprises, *inter alia*, means for transferring execution code from a central server to the computer resources, the computing resources receiving and executing one of the small tasks assigned to a mobile agent in the virtual machines using the execution code and the means for transferring execution code maintaining stack trace and state information about each of the mobile agents at a first alternate computing host where none of the mobile agents are executing to allow each of the mobile agents to be reconstructed at a second alternate computing host. This element and therefore the claim is not taught or suggested by any of the prior art of record, applied singularly or in combination, for the same reasons that have been advanced with regard to claim 1.

Claim 34 is also directed to a method for providing realistic thread migration which comprises, *inter alia*, the step of storing stack trace and state information about the mobile agent thread at a second computing host at which the mobile agent thread is not executing as the mobile agent thread executes at the first computing host, detecting an indication to migrate the mobile agent thread, and in response to the indication, stopping execution of the mobile agent thread, transferring the execution code for the mobile agent thread from a central server to a third computing host and transferring the stack trace and state information about the mobile agent thread to the third computing host. These steps simply are not taught or suggested by Jagannathan or any of the other references of record. As previously mentioned, Jagannathan does not store stack trace and state information about the mobile agent thread at a second computing host at which the mobile agent thread is not executing, nor is Jagannathan concerned with stopping execution of the mobile agent thread, transferring the execution code for the mobile agent thread from a central server to a third computing host and transferring the stack trace and state information about the mobile agent thread to the third computing host. These operations are simply not performed by Jagannathan and Jagannathan therefore cannot teach or suggest such operations.

In regard to claim 40 which claims an agent collaboration environment which comprises a plurality of mobile agents as well as an agent debugger for storing stack trace and state information about each of the plurality of mobile agents at a computing host where none of the plurality of mobile agents are executing, neither Reiffin nor Jagannathan, applied singularly or in combination with any of the other references of record, teach or suggest an agent debugger as claimed. Jagannathan maintains stack trace and state information at the very mobile agent that is executing. Moreover, neither Jagannathan nor the other references of record teach or suggest a conference room for providing a virtual workspace for mobile agents or a registration subsystem for selectively assigning the plurality of mobile agents to the conference room wherein each of the plurality of agents can share data information in results of computations in the conference room. With regard to this operation, the examiner identifies column 18, lines 39-51 as teaching a virtual workspace for mobile agents, but a careful review of this text indicates such not to be the case. The identified text merely describes migrating two subagents A1 and A2 to a place where these subagents are merged into a subagent A3. It is submitted that this is not the same type of operation that is claimed and in fact in applicant's environment the plurality of agents maintain their identity but can share information and results of computations in the conference room.

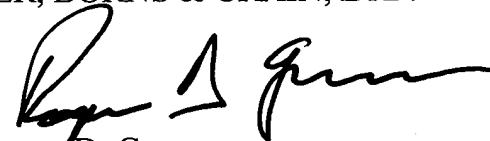
Claim 42 is directed to a method for dynamically constructing and executing the computer application in a heterogeneous computing environment using mobile agents comprising, *inter alia*, the step of monitoring execution of each of the plurality of mobile agents and storing stack trace and state information about execution of the mobile agents at a computing host where none of the mobile agents are executing. For the reasons that were advanced with regard to claim 1, it is believed that this claim is also in condition for allowance and reconsideration and allowance of it is respectfully requested.

The dependent claims necessarily incorporate the subject matter of the claims from which they depend and in addition recite other features or functionality not found in those claims and are therefore also allowable. Reconsideration and allowance of all dependent claims is therefore respectfully requested.

For the foregoing reasons, the application should be passed to issue without delay. If issues remain that need to be addressed prior to allowance or appeal, the examiner is requested to contact the undersigned at the examiner's early convenience.

Respectfully submitted,

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**REVOCATION OF POWER OF
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AND
CHANGE OF CORRESPONDENCE ADDRESS**

| | |
|------------------------|------------------|
| Application Number | 09/838,808 |
| Filing Date | 04/20/2001 |
| First Named Inventor | Marc Schneideman |
| Art Unit | 2195 |
| Examiner Name | Shah, Nilesh R. |
| Attorney Docket Number | 1370.72985 |

I hereby revoke all previous powers of attorney given in the above-identified application.

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I am the:

☒ Applicant/Inventor.

☐ Assignee of record of the entire interest. See 37 CFR 3.71.
Statement under 37 CFR 3.73(b) is enclosed. (Form PTO/SB/96)

SIGNATURE of Applicant or Assignee of Record

Signature

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NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below.

☐ *Total of _____ forms are submitted.

This collection of information is required by 37 CFR 1.36. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 36 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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